Office Action Summary	Application No.	Applicant(s)	
	10/731,091	FISHER ET AL.	
	Examiner	Art Unit	
	CANDAL ELPENORD	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *August 28, 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *December 10, 2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 28, 2008 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 1-3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al. (US 7,113,512 B1), and further view of Sugiyama et al (US 6,967,954 B2).

Regarding claim 1, Kermarec et al. discloses a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating Virtual Provide Local Area Network Service (VPLS) , comprising the steps of: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices (PEs) (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5) a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) having a VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018); exchanging information ("means for communication with other PEs", recited in paragraph 0029) between the PEs ("exchanges of tag frames connected to PEs", recited in paragraph 0018-0020) indicating; and for each pair of PEs (fig. fig. 2, PE-1 and PE-2, recited in paragraph 0044, lines 1-10), establishing a respective virtual circuit ("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) between the pair of PEs ("virtual circuits between PEs", recited in paragraph 0025) of each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10) as endpoints of the virtual circuit ("means for establishing a virtual circuit for

a PE, recited in paragraph 0036, lines 1-4), wherein a first PE of the pair of PEs determines whether the first is to initiate the circuit such that only one PE of the pair of PEs establishes the virtual circuit ("detecting whether a pair of Customer Edge devices belong to two PE devices, in response, establishing one virtual circuit", paragraphs 0022-0023).

regarding claim 2, the method ("virtual LAN service", recited in abstract, lines 1-7), wherein at each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10), **regarding claim 3**, the method ("virtual LAN service", recited in abstract, lines 1-7), wherein a second VPLS ("means for communicating with other PE and VLAN", recited in paragraph 0029, lines 1-10) is emulated at a plurality of the PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5);

Kermarec et al. discloses all the subject matter of the claimed invention with the exception of being silent with respect to the following features: **regarding claim 1**, the ATM address, **regarding claim 2**, the respective ATM address associated with VPLS is unique to the VPLS, **regarding claim 3**, the respective ATM address associated with the VPLS is also associated with the second VPLS.

However, Holmgren et al (US 7,113,512 B1) in a similar field of endeavor discloses the following features:

Regarding claim 1, discloses the ATM address (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6), the respective ATM address associated with VPLS is unique to the VPLS) associated with VLAN ("VLAN Tag associated with ATM address":, recited

in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Regarding claim 2, the respective ATM address (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6) , the respective ATM address associated with VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45) is unique to the VPLS (fig. 3, Mapping Table, Plurality of VLAN such as VLAN 100, VLAN 200 associated with a unique PVC, recited in col. 5, lines 4-21).

Regarding claim 3, the respective ATM address (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6) associated with the VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45) is also associated with the second VPLS (fig. 3, VLAN 200 Tag in mapping table 24 and 46, recited in col. 5, lines 6-22).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec et al. by using features as taught by Holmgren et al. in order to provide address resolution when sending frames/packets from a network to another network when there are different protocols in use (See col. 2, lines 37-66 for motivation).

Holmgren '512 and Kermarec '268 disclose all the claimed limitations as set forth with the exception of being silent with respect to claimed features:

Regarding claim 1, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining

whether the first or the second should initiate the virtual circuit; and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 1, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Holmgren '512 with Kermarec '268 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

6. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone et al (US 6,041,057) in view of Chase (US 2002/0101870 A1) and further view of Sugiyama et al (US 6,967,954 B2).

Regarding claim 4, Stone et al (US 6,041,057) discloses a method of emulating Virtual Provide Local Area Network Service (VPLS) in an Asynchronous Transfer Mode (ATM) network (fig. 1, ATM network 60 with interconnected switches which are associated with VLANs, col. 4, lines 50 to col. 5, lines 16), comprising the steps of: configuring at a plurality of provider edge devices (PEs) (fig. 1, Edge Switches 40, 10 connecting to the ATM Network 60, col. 4, lines 50-60) arranged in a Private Network Network Interface (PNNI) hierarchy (fig. 1, see plurality of edge switches connecting to the Transit Switches 30, 20, col. 4, lines 50-60) a VPLS having a VPLS Identifier (ID) (noted: VLAN switches with unique identifier, col. 5, lines 1-20+, fig. 4, VLAN ID, col. 9, lines 34-41); at each PE(fig. 1, Edge Switches 10 connecting to the ATM Network 60, col. 4, lines 50-60), generating a PNNI Topology State Element (PTSE) (noted: sharing of topology information including switch identifiers and VLAN information, col. 2, lines 38-48, "means to advertise topology information", col. 5, lines 27-39) a VPLS

Information Group (IG) the VPLS IG indicating the VPLS ID (noted: sharing of topology information including switch identifiers and VLAN information, col. 2, lines 38-48), an ATM address to be associated with the VPLS (noted: VLAN identifiers corresponding to ATM port identifiers, col. 3, lines 60-67), and a traffic characteristic (noted: associated link bandwidth, col. 5, lines 41-48, col. 9, lines 16-41) associated with the VPLS ID and the ATM address (noted: VLAN identifiers corresponding to ATM port identifiers, col. 3, lines 60-67); flooding each VPLS IG throughout the PNNI hierarchy (noted: periodic forwarding of topology messages to neighboring switches, col. 5, lines 27-39); and for each pair of PEs, establishing a respective virtual circuit (noted: establishing of a virtual connection to neighboring switches, col. 5, lines 63 to col. 6, lines 12), col. 6, lines 62 to col. 7, lines 5) between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit wherein the virtual circuit comprises a traffic characteristic equal to the minimum traffic characteristic of the pair of PEs.

Stone '057 discloses all the claimed limitation with the exception of being silent with respect to claimed features: wherein the wherein the virtual circuit comprises traffic characteristic equal to the minimum traffic characteristic of the pair of PEs.

However, Chase '870 from the same field of endeavor discloses the above claimed features: wherein the wherein the virtual circuit (fig. 5, VLAN Ids mapped to Permanent virtual circuits, paragraph 0028) comprises traffic characteristic equal to the minimum traffic characteristic (noted: varying the QoS level accordingly, abstract) of the pair of PEs (noted: using the customer descriptor in each frame, the provider edge

device maps the frame to the corresponding QoS level, paragraph 0027, lines 6-12, abstract).

In view of the above, having the teaching features of Stone '057 and the teaching features of Chase '870, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Stone '057 by using features as taught by Chase '870 in order to provide connections to differential QoS levels for different types of traffic as suggested in paragraph 0009.

Stone '057 and Chase '870 disclose all the claimed limitations as set forth with the exception of being silent with respect to claimed features:

Regarding claim 4, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 4, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE

supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Stone ‘057 with Chase ‘870 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

7. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Stone et al (US 6,041,057) in view of Chase (US 2002/0101870 A1) , Sugiyama et al (US 6,967,954 B2) as applied to claim 4 above, and further in view of Frelechoux et al (US 2002/00231 A1).

Regarding claim 5, Stone '057 discloses the method of wherein the step of flooding each VPLS IG throughout the PNNI hierarchy comprises the steps of: a VPLS IG indicating an association between the VPLS ID and an ATM address as describe in above paragraph.

Stone '057, Chase '870 and Sugiyama '954 are silent with respect to claimed features: at each PE, flooding the PTSE throughout a peer group of the PE, each peer group having a peer group leader; at each peer group leader, receiving each PTSE generated by a PE within the peer group of the peer group leader and flooding such PTSEs throughout a parent logical group of the peer group leader; at each peer group leader, receiving at least one other PTSE, each other PTSE containing a VPLS IG indicating an association between the VPLS ID and an ATM address, from the parent logical group of the peer group leader; and at each peer group leader, flooding the at least one other PTSE throughout the peer group of the peer group leader.

However, Frelechoux et al (US 2002/00231 A1) from the same field of endeavor discloses the above claimed features:

regarding claim 5, flooding the PTSE ("flooding PTSE", recited in paragraph 0003, lines 1-9) throughout a peer group ("flooding among nodes of peer group", recited in paragraph 0003), each peer group ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22) having a peer group leader ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22), at each peer group leader ("peer group leader", recited in paragraph 0002, lines 4-22), receiving each PTSE generated ("PTSEs generated by a logical group node", recited in

paragraph 0003, lines 11-21) within the peer group (“one peer group serving as a peer group leader”, recited in paragraph 0002, lines 4-22) of the peer group leader (“one peer group serving as a peer group leader”, recited in paragraph 0002, lines 4-22) and flooding such PTSEs (“generation of PTSEs and flooding", recited in paragraph 0003, lines 11-21) throughout a parent logical group of the peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22); at each peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22 and); receiving at least one other PTSE (“PTSEs receives form it neighbors”, recited in paragraph 0003, lines 11-22), each other PTSE (“receiving other PTSE form other group leader”, recited in paragraph 0043, from the parent logical group (“PTSEs generated by a logical group node”, recited in paragraph 0003, lines 11-21) of the peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22) ; and at each peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22), flooding the at least one other PTSE throughout the peer group (“flooding back down to low level nodes”, recited in paragraph 0003, lines 11-21) of the peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22).

In view of the above, having the teaching features of Stone ‘057, the teaching features of Chase ‘870 and the teaching features of Sugiyama ‘954, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Stone ‘057 with Chase ‘870, Sugiyama ‘954 by using features as taught by Frelechoux ‘231 in order to provide managerial function in PAR enabled device as suggested in paragraph 0009-0012 for motivation.

8. **Claims 6-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al (US 7,113,512 B1) and further view of Frelechoux et al (US 2002/0023163 A1), Sugiyama et al (US 6,967,954 B2).

Regarding claim 6, Kermarec et al. discloses a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating Virtual Provide Local Area Network Service (VPLS) comprising the steps: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5), a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) having VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018), for each pair of PEs (fig. fig. 2, PE-1 and PE-2, recited in paragraph 0044, lines 1-10), establishing a respective virtual circuit ("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) between the pair of PEs ("virtual circuits between PEs", recited in paragraph 0025) of each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10) as endpoints of the virtual circuit ("means for establishing a virtual circuit for a PE, recited in paragraph 0036, lines 1-4), the VPLS IG ("VC labels", recited in paragraph 0053) indicating the VPLS ID ("virtual ID", recited in paragraph 0049 and paragraph 0053).

regarding claims 7, a method ("virtual LAN service", recited in abstract, lines 1-7), wherein other PE ("means for communication with other PEs", recited in paragraph 0029).

Kermarec discloses all the claimed limitation with the exception of being silent with respect to claimed features:

regarding claim 6, the ATM network (Asynchronous Transfer Mode), a respective ATM address associated with VPLS and the ATM address to be associated with the VPLS.

However, Holmgren et al. in a similar field of endeavor discloses the following features: **regarding claim 6**, the ATM network (Asynchronous Transfer Mode) (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6), a respective ATM address("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45) associated with VPLS("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45) and the ATM address to be associated with the VPLS("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec et al. by using features ("interconnecting the ATM network to the Carrier Network) as taught by Holmgren et al. in order to provide address resolution when sending frames/packets from a network to another network when there are different protocols in use (See col. 2, lines 37-66 for motivation).

Holmgren et al. discloses all the subject matter of the claimed invention with the exception of being silent with respect to the following features: **regarding claim 6**, a

traffic characteristic associated with the VPLS and the ATM address, wherein the wherein the virtual circuit comprises traffic characteristic equal to the minimum traffic characteristic of the pair of PEs.

Kermarec '268, Holmgren '512, disclose all the claimed limitations with the exception of being silent with respect to claimed features:

Regarding claim 6, generating a PPNI Augmented Routing (PAR) Service IG, flooding each PAR Service IG throughout the ATM network.

Regarding claim 7, the method, wherein at least one other PE uses Proxy PAR to exchange PEs ATM address to be associated with the VPLS.

However, Frelechoux et al. in a similar field of endeavor discloses the following features:

regarding claim 6, generating a PPNI Augmented Routing ("employing PPNI PAR, recited in paragraph 0005, lines 10-14 and lines 19-29 and "flooding to other ATM switches", recited in paragraph 0007) (PAR) Service IG ("PAR Client Services", recited in paragraph 0006, lines 10-23), flooding ("flooding to other ATM switches", recited in paragraph 0007) each PAR Service IG ("check of ATM address of IP service", recited in paragraph 0019, lines 1-5) throughout the ATM network ("ATM cloud", recited in paragraph 0007, lines 7-9).

regarding claim 7, uses Proxy PAR ("use of PAR for communicating of protocol information between devices", recited in paragraph 0008, lines 1-13) to exchange ATM

address (“register and exchange of routing information", recited in paragraph 0007, lines 17-25).

In view of the above, having the method for providing VPN service using virtual circuit of Kermarec ‘268, and the teaching features of Holmgren ‘512, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify the features of Kermarec ‘268 with Holmgren ‘512, Ginipalli '577 by using features as taught by Frelechoux et al. in order to provide managerial function in PAR enabled device as suggested in paragraph 0009-0012 for motivation.

Kermarec ‘268, Holmgren ‘512 and Frelechoux ‘163 disclose all the claimed limitation with the exception of being silent with respect to claimed features:

Regarding claim 6, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and automatically establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit wherein the victual circuit comprises a traffic characteristics equal to the minimum traffic characteristics of the pair of PEs.

However, Sugiyama ‘954 from the same field of endeavor discloses the above claimed features:

Regarding claim 6, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3,

see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46), wherein the victual circuit comprises a traffic characteristics equal to the minimum traffic characteristics of the pair of PEs (fig. 4 to fig. 5, , see plurality of virtual circuits that are operable to be established based on traffic class such CBR, UBR, VBR, col. 6, lines 19-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Kermarec ‘268 with Holmgren ‘512, Ginipalli '577 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

9. **Claims 8-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al (US 7,113,512 B1), Frelechoux et al (US 2002/0023163 A1), Sugiyama et al (US 6,967,954 B2) as applied to claim 7above, and further view of Rochberger (US 6,456, 600 B1).

Kermarec '268, Holmgren '512, Ginipalli '577, Frelechoux '163 and Sugiyama '954 disclose all the subject matter of the claimed invention with the exception of being silent with regard to the following features: **regarding claim 8**, an ATM link employing an ATM User Network Interface (UNI) signaling protocol, **regarding claim 9**, an ATM link employing an ATM Inter-Network Interface (AINI) signaling protocol.

However, Rochberger '600 from the same field of endeavor discloses the above claimed features:

Regarding claim 8, an ATM link ("interconnect ATM user to a ATM switch", recited in col. 1, lines 53-59 and col. 1, lines 25-32) employing an ATM User Network Interface (UNI) signaling protocol ("UNI signaling mechanisms for multipoint connections", recited in col. 2, lines 16-23).

Regarding claim 9, an ATM link ("interconnect ATM user to a ATM switch", recited in col. 1, lines 53-59 and col. 1, lines 25-32) employing an ATM Inter-Network Interface (AINI) signaling protocol ("AINI", recited in col. 8, lines 25-55).

Therefore, it would have been obvious to one of ordinary skill in art at the time the invention was made to modify the features of Kermarec '268 with Holmgren '512, Frelechoux '163, and Sugiyama '954 by using the well known ATM standards as

disclosed by Rochberger et al. in order to provide interconnection to ATM devices as suggested in col. 1, lines 30-col. 2, lines 1-15 for motivation.

10. **Claims 10-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nair et al (US 6,337,863 B1) in view of Frelechoux et al (US 2002/0023263 A1) and further view of Stone et al (US 6,041,057), Sugiyama et al (US 6,967,954 B2).

Regarding claim 10, Nair et al. discloses a method of advertising ("advertises of addresses and services", recited in abstract, lines 1-15) a service ("service of point-to-point of broadcast out and point-to-point broadcast-in", recited in col. 3, lines 9-15) having a service identifier (ID) ("VLAN identifier and service", recited in col. 4, lines 4-13) within an Asynchronous Transfer Mode (ATM) network, the ATM network (fig. 1, ATM Cloud 90, recited in col. 5, lines 6-19), the ATM network ((fig. 1, ATM Cloud 90, recited in col. 5, lines 6-19) including a plurality of nodes (fig. 1, edge devices 100,200, 300, recited in col. 5, lines 6-19) arranged in a Private Network-Network Interface (PNNI) hierarchy (fig. 1, Network System as the PNNI hierarchy, recited in col. 5, lines 6-19), the method ("advertises of addresses and services", recited in abstract, lines 1-15) comprising the steps of: at each node (fig. 1, Edge device, 100, recited in col. 5, lines 6-19) which supports the service ("edge device for purpose of services", recited in col. 3, lines 16-26), generating a PNNI Topology State Element (PTSE) including a service Information Group (IG) ("group membership and services", recited in col. 5, lines 15-35), the service IG indicating the service ID and an ATM address ("means for

directing virtual circuits to members", recited in col. 6, lines 31-43) to be associated with the service ("group membership and services", recited in col. 5, lines 15-35).

Regarding claim 11, Nair et al. discloses a method of advertising ("advertises of addresses and services", recited in abstract, lines 1-15) a service ("service of point-to-point of broadcast out and point-to-point broadcast-in", recited in col. 3, lines 9-15) having a service identifier (ID) ("VLAN identifier and service", recited in col. 4, lines 4-13) within an Asynchronous Transfer Mode (ATM) network, the ATM network (fig. 1, ATM Cloud 90, recited in col. 5, lines 6-19), the ATM network ((fig. 1, ATM Cloud 90, recited in col. 5, lines 6-19) including a plurality of nodes (fig. 1, edge devices 100,200, 300, recited in col. 5, lines 6-19) arranged in a Private Network-Network Interface (PNNI) hierarchy (fig. 1, Network System as the PNNI hierarchy, recited in col. 5, lines 6-19), the method ("advertises of addresses and services", recited in abstract, lines 1-15) comprising the steps of: at each node (fig. 1, Edge device, 100, recited in col. 5, lines 6-19) which supports the service ("edge device for purpose of services", recited in col. 3, lines 16-26), generating a PNNI Topology State Element (PTSE) including a service Information Group (IG) ("group 3 membership and services", recited in col. 5, lines 15-35), the service IG indicating the service ID and an ATM address ("means for directing virtual circuits to members", recited in col. 6, lines 31-43) to be associated with the service ("group membership and services", recited in col. 5, lines 15-35) and PE (fig. 1, ATM switches and edge devices 100-300, recited in col. 5, lines 6-15).

Nair et al. discloses all the subject matter of the claimed invention with the exception of being silent with respect to the following features:

Regarding claim 10, generating a PNNI Topology State Element (PTSE) and flooding PTSE throughout the PPNNI.

Regarding claim 11, generating a PNNI Topology State Element (PTSE) and flooding PTSE throughout the PPNI, flooding the PTSE throughout a peer group, each peer group having a peer group leader, at each peer group leader, receiving each PTSE generated by a PE within the peer group of the peer group leader and flooding such PTSEs throughout a parent logical group of the peer group leader; at each peer group leader, receiving at least one other PTSE, each other PTSE, from the parent logical group of the peer group leader; and at each peer group leader, flooding the at least one other PTSE throughout the peer group of the peer group leader.

However, Frelechoux '263 from the same field of endeavor discloses the above claimed features:

Regarding claim 10, generating a PNNI Topology State Element (PTSE) (generation of PTSEs and flooding", recited in paragraph 0003, lines 11-21) and flooding PTSE throughout the PPNI (generation of PTSEs and flooding", recited in paragraph 0003, lines 11-21).

Regarding claim 11, flooding the PTSE ("flooding PTSE", recited in paragraph 0003, lines 1-9) throughout a peer group ("flooding among nodes of peer group", recited in paragraph 0003), each peer group ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22) having a peer group leader ("one peer group serving as a peer group leader", recited in paragraph 0002, lines 4-22), at each

peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22), receiving each PTSE generated (“PTSEs generated by a logical group node”, recited in paragraph 0003, lines 11-21) within the peer group (“one peer group serving as a peer group leader”, recited in paragraph 0002, lines 4-22) of the peer group leader (“one peer group serving as a peer group leader”, recited in paragraph 0002, lines 4-22) and flooding such PTSEs (“generation of PTSEs and flooding", recited in paragraph 0003, lines 11-21) throughout a parent logical group of the peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22); at each peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22 and); receiving at least one other PTSE (“PTSEs receives form its neighbors”, recited in paragraph 0003, lines 11-22), each other PTSE (“receiving other PTSE form other group leader”, recited in paragraph 0043, from the parent logical group (“PTSEs generated by a logical group node”, recited in paragraph 0003, lines 11-21) of the peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22) ; and at each peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22), flooding the at least one other PTSE throughout the peer group (“flooding back down to low level nodes”, recited in paragraph 0003, lines 11-21) of the peer group leader (“peer group leader”, recited in paragraph 0002, lines 4-22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Nair et al. by using features as taught by Frelechoux et al. in order to provide managerial function in PAR enabled

device and efficient networking with respect to bandwidth preservation through flooding (See paragraph 0009-0012 for motivation).

Nair '863 and Frelechoux '263 disclose all the claimed limitation with the exception of being silent with respect to the claimed features:

Regarding claim 10, flooding the PNNI hierarchy by generating at least one message, each message containing at least two PTSEs.

Regarding claim 11, generating at least one message, each message containing at least two PTSEs.

However, Stone '057 from the same field of endeavor discloses the above claimed features:

Regarding claim 10, flooding the PNNI hierarchy (fig. 12, Edge Switch 40, 10 being arranged in a PNNI hierarchy) by generating at least one message, each message containing at least two PTSEs (noted: generating of topology messages encoded with port identifiers including path cost and VLAN identifiers and periodic forwarding of topology messages to other switches, col. 5, lines 27-39+).

Regarding claim 11, generating at least one message (noted: Top ADV Means to serve and advertise topology messages, Means to generate of Topology messages, col. 5, lines 27-39+), each message containing at least two PTSEs (noted: generating of topology messages encoded with port identifiers including path cost and VLAN identifiers and periodic forwarding of topology messages to other switches, col. 5, lines 27-39+).

In view of the above, having the method for providing seamless services over an ATM network of Nair '863 and the methods and the apparatus for managing protocol information in a PNNI hierarchical network of Frelechoux '163, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Nair '863 with Frelechoux '163 by using features as taught by Stone '057 in order to provide virtual connections whereby topology information/messages are shared as suggested in col. 2, lines 37-48 for motivation.

Nair '863, Frelechoux '163 and Stone '057 disclose all the claimed limitations as set forth above with the exception of being silent with respect to claimed features:

Regarding claim 10, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

Regarding claim 11, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 10, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

Regarding claim 11, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE

supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Nair '863 with Frelechoux '163, Stone ''057 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

11. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nair et al (US 6,337,863 B1) in view of Sugiyama et al (US 6,967,954 B2).

Regarding claim 12, Nair '863 discloses a method of emulating a Virtual Private Local Area Network Service (VPLS) (noted: providing services over an ATM network that can support VLANs, col. 2, lines 65-67) at a Provider Edge device (PE) (noted:

providing services at a edge device, col. 3, lines 1-4, configuring of service at an edge device, 3, lines 9-22) within an Asynchronous Transfer Mode (ATM) network (fig. 1, ATM cloud 90, col. 5, lines 4-15), comprising the following steps of: configuring at the PEs (fig. 1, Edge Devices 100, 70, 300 and 200, col. 5, lines 6-18) VPLS Identifier (ID) associated with the VPLS (noted: VLAN identifiers associated with ATM network, col. 4, lines 4-9), including associating an ATM address with the VPLS ID (noted: means for associating address with virtual circuit by determining the VALAN identifier, col. 7, lines 2-27); advertising the association between the VPLS ID and the ATM address to other nodes (Noted: advertising of addresses to other members, col. 3, lines 19-26) within the ATM network (fig. 1, ATM cloud 90, col. 5, lines 4-15); determining other ATM addresses within the ATM network (fig. 1, ATM cloud 90, col. 5, lines 4-15) which are associated with the VPLS (noted: means for determining port identifier associated with VLAN Id, and means for retrieving destination addresses associated with virtual circuits, col. 6, lines 7-43); for each such other ATM address, determining whether the PE is to set up a virtual circuit with the ATM address by comparing the ATM address of the PE with the other ATM address (noted: means retrieving and from a table and directing virtual circuits to other members, col. 6, lines 27-54); and for each such other ATM address with which the PE determines that the PE is to set up a virtual circuit, setting up a virtual circuit with the other ATM address (noted: means for determining port identifier associated with VLAN Id, and means for retrieving destination addresses associated with virtual circuits, col. 6, lines 7-43; noted: means retrieving and from a table and directing virtual circuits to other members, col. 6, lines 27-54)).

Nair '863 discloses all the claimed limitations as set forth above with the exception of being silent with respect to claimed features:

Regarding claim 12, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 12, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the

routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, having the seamless communications service with intelligent edge devices of Nair '863, the method for provisioning VPN service based on QoS over an ATM network of Sugiyama '954, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Nair '863 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

12. **Claims 13-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al (US 7,113,512 B1) in further view of Ginipalli et al (US 7,292,577 B1) and Sugiyama et al (US 6,967,954 B2).

Regarding claim 13, Kermarec et al. discloses a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating Virtual Provide Local Area Network Service (VPLS) comprising the steps: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5), a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) having VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018), for each pair of PEs (fig. fig. 2, PE-1 and PE-2, recited in paragraph 0044, lines 1-10), establishing a respective virtual circuit

("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) between the pair of PEs ("virtual circuits between PEs", recited in paragraph 0025) of each PE (fig. 2, PE-1, recited in paragraph 0044, lines 1-10) as endpoints of the virtual circuit ("means for establishing a virtual circuit for a PE, recited in paragraph 0036, lines 1-4), advertising the association between the VPLS ID ("flooding of VLAN id to other PEs", recited in paragraph 0027, lines 1-14).

Regarding claim 14, the method ("virtual LAN service", recited in abstract, lines 1-7), wherein the steps of setting up a virtual circuit ("means for establishing a virtual circuit for a PE, recited in paragraph 0036, lines 1-4).

Kermarec et al. is silent with respect to the following features: **regarding claim 13**, the ATM network, advertising the association between the VPLS ID and the ATM address to other nodes within the ATM network; determining other ATM addresses within the ATM network which are associated with the VPLS, set up virtual circuit with the ATM address.

However, Holmgren et al. in a similar field of endeavor discloses the following features:

Regarding claim 13, the ATM network (fig. ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6), advertising (fig. 2, "Broadcast ARP and floods", recited in col. 3, lines 60-65) the ATM address ("resolved addresses and facilitate of transmission", recited in col. 4, lines 20-29) to other nodes (fig. 1, nodes 28, 30, 32, recited in col. 4, lines 20-29) within the ATM network (fig. ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6); determining other ATM addresses ("determining the VLAN tag to an ATM

PVC", recited in col. 3, lines 60-67 and col. 4, lines 1-6) within the ATM network (fig. ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6), which are associated with the VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), set up virtual circuit with the ATM address ("mapping of VLAN tag to corresponding ATM PVC", recited in col. 5, lines 6-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec et al. by using features ("interconnecting the ATM network to the Carrier Network) as taught by Holmgren et al. in order to provide address resolution when sending frames/packets from a network to another network when there are different protocols in use (See col. 2, lines 37-66 for motivation).

Kermarec and Holmgren are silent with respect to the claimed features:

Regarding claim 13, at least one traffic characteristic to be associated with the VPLS ID and the ATM address, wherein the circuit comprises a traffic characteristic equal to a minimum of the one traffic characteristic and a second traffic characteristic associated with other ATM address.

Regarding claim 14, wherein the step of setting up a virtual circuit comprises setting up the virtual circuit in conformance with the at least one traffic characteristic.

However, Ginipalli '577 from the same field of endeavor discloses the above claimed features:

Regarding claim 13, at least one traffic characteristic to be associated with the VPLS ID and the ATM address (fig. 4 in combination with fig. 5, see, plurality of VLAN Ids associated with VPI/VPC and associated class of services which include CBR, VBR, UBR, col. 5, lines 12-37), wherein the circuit comprises a traffic characteristic equal to a minimum of the one traffic characteristic and a second traffic characteristic associated with other ATM address (noted: mapping of virtual connections as the traffic arrives at the device with different classes of service based on VLAN Id/priority, col. 3, lines 54 to col. 6, lines 15, fig. 6, col. 5, lines 38-56).

Regarding claim 14, wherein the step of setting up a virtual circuit comprises setting up the virtual circuit in conformance with the at least one traffic characteristic (noted: setting up of virtual connect with a constant bit rate, col. 3, lines 54-67, see fig. 4 to fig. 6, which associations of different classes of service with Virtual Circuit/Virtual Path and VLAN IDs).

In view of the above, having the methods for providing and establishing of virtual private network services of Kermarec ‘268, and the method for Ethernet VLAN services over an ATM network of Holmgren ‘512, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the features of Kermarec ‘268 with Holmgren ‘512 by using features as taught by Ginipalli '577 in order to provide differential services based on VLAN IDs and VLAN priority as suggested in col. 2, lines 61 to col. 3, lines 3 for motivation.

Kermarec '268, Holmgren '512 and Ginipalli '577 disclose all the claimed limitations as set forth above with the exception of being silent with respect to claimed features:

Regarding claim 13, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 13, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on

the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Kermarec '268 with Holmgren '512 and Ginipalli '577 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

13. **Claims 15-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kermarec et al (US 2003/0110268 A1) in view of Holmgren et al (US 7,113,512 B1) in further view Stone et al (US 6,041,057), Frelechoux et al (US 2002/0023163 A1).

Regarding claim 15, Kermarec et al. discloses a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating a Virtual Private Local Area Network Service (VPLS) at a Provider Edge device (PE) that is part of Private Network-Network Interface (PNNI) hierarchy within an Asynchronous Transfer Mode (ATM) network, comprising the steps of: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5), a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) having VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018), for each pair of PEs (fig. fig. 2, PE-1 and PE-2,

recited in paragraph 0044, lines 1-10), determining whether PE ("virtual circuits between PEs", recited in paragraph 0025) is to set up a virtual circuit ("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) , advertising the association between the VPLS ID ("flooding using VLAN id", recited in paragraph 0027 and paragraph 0047), a VPLS information group (IG) ("VC labels", recited in paragraph 0053 and fig. 4, VC-label1 and VC-label2), the VPLS ("VC labels", recited in paragraph 0053 and fig. 4, VC-label1 and VC-label2) indicating the VPLS ID ("virtual ID", recited in paragraph 0049 and paragraph 0053).

Regarding claim 16, a method ("virtual LAN service", recited in abstract, lines 1-7) of emulating a Virtual Private Local Area Network Service (VPLS) at a Provider Edge device (PE) that is part of Private Network-Network Interface (PNNI) hierarchy within an Asynchronous Transfer Mode (ATM) network, comprising the steps of: configuring ("interconnected of plurality of PEs", recited in paragraph 0020, lines 1-9) at a plurality of provider edge devices PEs (fig. PE-1 to PE-3, "plurality of provider edge devices, recited in paragraph 0052, lines 1-5), a VPLS (fig. 3, VALN 3,5 to VLAN 3,7, recited in paragraph 0052) having VPLS Identifier (ID) (VLAN id, recited in paragraph 0025 and 0018), for each pair of PEs (fig. fig. 2, PE-1 and PE-2, recited in paragraph 0044, lines 1-10), determining whether PE ("virtual circuits between PEs", recited in paragraph 0025) is to set up a virtual circuit ("establishing a virtual circuit", recited in paragraph 0019, lines 1-5) , advertising the association between the VPLS ID ("flooding using VLAN id", recited in paragraph 0027 and paragraph 0047), a VPLS information group (IG) ("VC labels", recited in paragraph 0053 and fig. 4, VC-label1 and VC-label2), the

VPLS ("VC labels", recited in paragraph 0053 and fig. 4, VC-label1 and VC-label2) indicating the VPLS ID ("virtual ID", recited in paragraph 0049 and paragraph 0053).

Kermarec et al. discloses all the claimed limitation with the exception of being silent with respect to claimed features:

Regarding claim 15-16, the ATM network, associating an ATM address with the VPLS ID, advertising the ATM address to other nodes within the network, determining other ATM addresses within the ATM network which are associated with the ATM address, for each ATM address set up a virtual circuit, for each such other ATM address, setting up a virtual circuit with other ATM address, the steps of advertising the association between the VPLS and the ATM address to other nodes within the VPLS; and the ATM address associated with the VPLS; and flooding the PTSE throughout the peer group of the node.

However, Holmgren '512 from the same field of endeavor discloses the above claimed features:

Regarding claim 15-16, the ATM network (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6 and "ATM destination routers connecting to the edge devices, recited in col. 3, lines 44-53),associating an ATM address with the VPLS ID ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), advertising ("flooding to determine destinations", recited in col. 3, lines 54-64 and fig. 2, "Broadcast ARP and floods", recited in col. 3, lines 60-65) the ATM address ("destinations to the ATM", recited in col. 3, lines 54-65) to other nodes (fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines

44-53) within the network (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6), determining other ATM addresses ("determine destinations", recited in col. 3, lines 54-64) within the ATM network (fig. ATM Network, recited in col. 3, lines 54-col. 4, lines 6) which are associated with the ATM address ("mapping VLAN to a path in the ATM network", recited in col. 3, lines 65-67 and col. 4, lines 1-6-("PVC which is the ATM address"), for each ATM address ("ATM address", recited in col. 5, lines 5-13) set up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13), for each such other ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53), setting up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13), with other ATM address (fig. 1, Plurality of PVCs in the VLAN mapping table, recited in col. 3, lines 44-53) the VPLS (fig. 1 and fig. VLAN and the ATM address to other nodes (fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines 44-53) within the VPLS (fig. 1 and fig. 3, VLAN table); and the ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53), associated with the VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec et al. by using features as taught by Holmgren et al. in order to provide address resolution when sending frames/packets from a network to another network when there are different protocols in use (See col. 2, lines 37-66 for motivation).

Kermarec'268 and Holmgren'512 from the same field of endeavor disclose all the claimed limitation with the exception of being silent with respect to claimed features:

Regarding claim 15-16, setting up a virtual circuit with other ATM address by sending a setup message to other ATM address, the setup message including the VPLS ID, wherein the step of advertising the association between the VPLS ID and the ATM address to other nodes within the VPLS comprises the steps of:

However, Stone '057 from the same field of endeavor discloses the above claimed features:

Regarding claim 15-16, setting a up a virtual circuit with other ATM address by sending a setup message to other ATM address (noted: means to initiate requests for virtual connection and means for determining the ATM port for a particular VLAN including the VLAN identifier, col. 6, lines 32-51), the setup message including the VPLS ID, wherein the step of advertising the association between the VPLS ID and the ATM address to other nodes within the VPLS (noted: periodic forwarding of topology messages including VLAN identifiers to other switches, col. 5, lines 27-39).

In view of the above, having the methods for providing and establishing of virtual private network services of Kermarec '268, and the method for Ethernet VLAN services over an ATM network of Holmgren '512, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the features of Kermarec '268 with Holmgren '512 by using features as taught by Stone '057 in order to provide virtual connections whereby topology information/messages are shared as suggested in col. 2, lines 37-48 for motivation.

Kermarec '268, Holmgren '512, and Stone '057 disclose all the claimed limitation with the exception of the following features:

Regarding claim 15, generating a PNNI Topology State Element (PTSE) flooding the PTSE throughout the peer group of the node.

Regarding claim 16, generating a Private Network-Network Interface (PNNI) Augmented Routing (PAR), flooding the PAR Service IG throughout the ATM network.

However, Frelechoux '163 form the same field of endeavor discloses the above claimed features:

Regarding claim 15, generating a PNNI Topology State Element (PTSE) (generation of PTSEs and flooding", recited in paragraph 0003, lines 11-21), flooding the PTSE ("flooding PTSE", recited in paragraph 0003, lines 1-9) throughout the peer group of the node ("flooding among nodes of peer group", recited in paragraph 0003).

Regarding claim 16, generating a Private Network-Network Interface (PNNI) Augmented Routing (PAR) ("employing PPNI PAR, recited in paragraph 0005, lines 10-14 and lines 19-29 and "flooding to other ATM switches", recited in paragraph 0007), flooding ("flooding to other ATM switches", recited in paragraph 0007) the PAR Service IG ("PAR Client Services", recited in paragraph 0006, lines 10-23) throughout the ATM network ("flooding to other ATM switches", recited in paragraph 0007).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Kermarec '268, Holmgren '512, and Stone '057 by using ATM standard and features as taught by Frelechoux '163 in

order to provide managerial function in PAR enabled device (See paragraph 0009-0012 for motivation).

Kermarec '268, Holmgren '512 and Ginipalli '577 disclose all the claimed limitations as set forth above with the exception of being silent with respect to claimed features:

Regarding claims 15-16, selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, determining whether the first or the second should initiate the virtual circuit; and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 15, selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1);

and establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Kermarec '268 with Holmgren ''512 with Ginipalli '577 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

14. **Claims 17-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmgren et al (US 7,113,512) in view of Stone et al (US 6,041057), and further view of Kermarec et al (US 2003/0110268 A1), Frelechoux et al (US 2002/0023163 A1) and Sugiyama et al (US 6,967,954 B2).

Regarding claim 17, Holmgren et al. discloses a node (fig. 1, Edge devices/nodes 30, 28 and 32, recited in col. 3, lines 54-60) within an Asynchronous Transfer Mode (ATM) network (fig. 2, ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6), comprising: means ("receiving VLAN Tag", recited in col. 6, lines 3-11) for receiving a Virtual Private Local Area Network Service (VPLS) identifier (ID) ("VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the

Mapping Table, recited in col. 4, lines 30-45), a VPLS controller (fig. 2 and fig. 3, VLAN Mapping table-EIWS 24, recited in col. 3, lines 54-67 and col. 4, lines 1-6) comprising a computer-readable medium encoded with instructions, the computer-readable medium comprising: instructions for associating an ATM address with the VPLS ID ("VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), instructions for advertising (fig. 2, "Broadcast ARP and floods", recited in col. 3, lines 60-65) the association between the ATM address and the VPLS ID ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45) to other nodes within the ATM network (fig. 2, ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6), recited in col. ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45); instructions for determining ("determining destination address among multiple PVCs", recited in col. 5, lines 6-13) other ATM addresses within the ATM network (fig. 2, ATM Network 26, recited in col. 3, lines 54-col. 4, lines 6) which are associated with the VPLS ID ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45); instruction for, for each such other ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53), determining whether the node (fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines 44-53) is to set up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13) with other ATM address (fig. 1, Plurality of PVCs in the VLAN mapping table, recited in col. 3, lines 44-53); and

instructions, for, for each such other ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53) that the node (fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines 44-53) determines that the node(fig. 1, Edge devices, 28,30, and 32, recited in col. 3, lines 44-53) is to set up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13), setting up a virtual circuit ("mapping to corresponding PVC", recited in col. 5, lines 5-13) with other ATM address (fig. 1, plurality of ATM destination routers 14,16, and 18, recited in col. 3, lines 44-53).

Holmgren '512 discloses all the claimed limitation with the exception of being silent with respect to claimed features: **regarding claim 17**, instructions for guaranteeing that only one virtual circuit is set up between the node an the other ATM addresses.

However, Stone '057 from the same field of endeavor discloses the above claimed features: **regarding claim 17**, instructions for guaranteeing that only one virtual circuit is set up between the node and the other ATM addresses (noted: establishing of a virtual circuit in response to a request for virtual connections to ATM destination switches, col. 6, lines 1-12, lines 31-51).

In view of the above, having the method for Ethernet VLAN services over an ATM network of Holmgren '512, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the features of Holmgren '512 by using features as taught by Stone '057 in order to provide virtual connections whereby topology information/messages are shared as suggested in col. 2, lines 37-48 for motivation.

Regarding claim 18, Holmgren '512 discloses wherein the instructions for advertising the association between the ATM address and the VPLS ID comprise: the ATM address associated with the VPLS ("VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Regarding claim 19, Holmgren '512 discloses wherein the instructions for advertising (fig. 2, "Broadcast ARP and floods", recited in col. 3, lines 60-65) the association between the ATM address and the VPLS ID ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45); comprise: the VPLS ID and the ATM address to be associated with the VPLS ("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Regarding claim 20, Holmgren '512 discloses the node (fig. 1, Edge devices 28,30 and 32, recited in col. 3, lines 44-53), wherein the instructions for advertising the association between the ATM address("VLAN Tag associated with ATM address":, recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45), and the VPLS ID ("VLAN tag", recited in col. 2, lines 27-36).

Holmgren'512, and Stone '057 disclose all the claimed limitation with the exception of being silent with respect of claimed features:

Regarding claim 18, the VPLS information group (IG), the Service information group (IG) including the VPLS ID.

Regarding claim 19, flooding the IG, **regarding claim 21**, receiving a service (ID) identifying the service, a service information group (IG), the service indicating the service ID, instructions for flooding the IG throughout the PNNI hierarchy, **regarding claim 22**, the VPLS information group (IG).

However, Kermarec '268 from the same field of endeavor discloses the above claimed features:

Regarding claim 18, the VPLS information group (IG) ("VC labels", recited in paragraph 0053 and fig. 4, VC-label 1 and VC-label 2), the Service information group (IG) ("VC labels", recited in paragraph 0053) including the VPLS ID ("VLAN ID", recited in paragraph 0027).

Regarding claim 19, flooding the IG ("flooding of VC-label to every PE device", recited in paragraph 0027, lines 1-14).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Holmgren '512 with Stone '057 by using features as taught Kermarec '268 in order to provide virtual private LAN service by establishing a virtual circuit at the provider edge device as suggested in paragraph 0017 for motivation.

Holmgren'512, and Stone '057, Kermarec '268 disclose all the claimed limitation with the exception of being silent with respect of claimed features:

Regarding claim 18, node that is part of Private Network-Network Interface (PNNI) hierarchy, instructions for generating a PNNI Topology State Element (PTSE),

including a VPLS information Group, the VPLS IG indicating the VPLS ID and the ATM address, instructions for flooding the PTSE throughout a peer group of the node.

Regarding claim 19, the node of a Private Network-Network Interface (PNNI) hierarchy, and instructions for generating a PNNI Topology State Element (PTSE), instructions for generating a PNNI augmented Routing (PAR), instructions for flooding the PAR service IG throughout the ATM network.

Regarding claim 20, instructions for delivering to a second node using Proxy PAR.

However, Frelechoux '163 from the same field of endeavor discloses the above claimed features:

Regarding claim 18, node that is part of Private Network-Network Interface (PNNI) hierarchy, instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for generating a PNNI Topology State Element (PTSE) ("flooding PTSE back down to child groups", recited in paragraph 0046, lines 3-19), including a VPLS information Group, the VPLS IG indicating the VPLS ID and the ATM address, instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for flooding ("flooding of PTSEs", recited in paragraph 0003, lines 7-16) the PTSE throughout a peer group ("peer group of the node", recited in paragraph 0003, lines 1-14) of the node (fig. 2, Peer Group 88 of Logical Node Group 1.12, recited in paragraph 0045, lines 11-18).

Regarding claim 19, the node (fig. 1 and fig. 2, LGN1.0, recited in paragraph 0045, lines 5-18) of a Private Network-Network Interface (PNNI) hierarchy (fig. 1, PNNI

level 64, recited in paragraph 0045, lines 5-18) , and instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for generating ("generation of PTSEs and flooding", recited in paragraph 0003, lines1-7 and 11-21) a PNNI Topology State Element (PTSE) ("PNNI", recited in paragraph 0003, lines 1-7, and fig. 2, PPNI levels 64 and 72, recited in paragraph 0040, lines 7-17), instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for generating ("generated of protocol information by PAR enabled device-PNNI-PAR", recited in paragraph 0031) a PNNI augmented Routing (PAR)("PNNI PAR", recited in paragraph 0031), instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for flooding ("advertise IP information by flooding PAR PTSEs", recited in paragraph 0041) the PAR service IG throughout the ATM network ("advertised in the ATM network up to PNNI level", recited in paragraph 0042, lines 1-8).

Regarding claim 20, instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for delivering ("forwarding information", recited in paragraph 0043, lines19-21) to a second node (fig. 2, LGN 2.1.1, "Logical Group Node 2.1.1", recited in paragraph 0043) using Proxy PAR ("forwards of information, flooding via Proxy-PAR", recited in paragraph 0043).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Holmgren'512 with Stone '057, Kermarec '268 by using features as taught by Frelechoux '163 in order to provide managerial function in PAR enabled device (See paragraph 0009-0012 for motivation).

Holmgren '512, Stone '057, Kermarec '268, Frelechoux '512 disclose all the claimed limitations with the exception of being silent with respect to claimed features:

Regarding claim 17, instructions for selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, instructions for determining whether the first or the second should initiate the virtual circuit; and instructions for automatically establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 17, instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for

determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for automatically establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Holmgren '512 with Stone '057, Kermarec '268 and Frelechoux '512 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

15. **Claims 21-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmgren et al (US 7,113,512) in view of Stone et al (US 6,041057), and further view of Kermarec et al (US 2003/0110268 A1), Frelechoux et al (US 2002/0023163 A1) and Sugiyama et al (US 6,967,954 B2).

Regarding claim 21, Holmgren '512 discloses a node (fig. 1, Edge devices 28,30 and 32, recited in col. 3, lines 44-53) within an Asynchronous Transfer Mode (ATM) network (fig. 1, ATM Network 26, recited in col. 3, lines 44-53), the node (fig. 1, Edge devices 28,30 and 32, recited in col. 3, lines 44-53) being part of a Private Network-Network Interface (PNNI) hierarchy within the ATM network (fig. 1, ATM Network 26, recited in col. 3, lines 44-53) and comprising a computer-readable medium encoded with instructions, the computer-readable medium comprising: instructions for receiving a service identifier (ID) identifier a service ("receiving VLAN Tag", recited in col. 6, lines 3-11, "VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45).

Regarding claim 22, Holmgren '512 discloses a logical group node within a Private Network-Network Interface (PNNI) hierarchy in an Asynchronous Transfer Mode (ATM) network (fig. 2, ATM Network 26), the logical group node having a peer group and a child peer group, and comprising a computer-readable medium encoded with instructions, the computer-readable medium comprising: a VPLS ID and an ATM address, an association between the VPLS ID and an ATM address ("VLAN Tag associated with ATM address", recited in col. 2, lines 13-34 and fig. 3, VLAN in the Mapping Table, recited in col. 4, lines 30-45)

Holmgren et al. discloses all the claimed limitation with the exception of being silent with respect of the following features:

Regarding claim 21, a service information group (IG), the service indicating the service ID, and instructions for flooding the IG throughout the PNNI hierarchy.

Regarding claim 22, the VPLS information group (IG).

However, Kermarec et al. in a similar field of endeavor discloses the following features:

Regarding claim 21, receiving a service (ID) identifying the service ("St34 "allocate VC label to (VPN-id)", recited in paragraph 0055, lines 11-14), a service information group (IG) ("VC labels", recited in paragraph 0053), the service indicating the service ID, instructions for flooding (fig. 4, Switch and Control Module programmed to implement VPN service", recited in paragraph 0045, lines 3-6) the IG ("flooding of VC-label to every PE device", recited in paragraph 0027, lines 1-14) throughout the PNNI hierarchy (fig. 2, and fig.3 as PNNI hierarchy).

Regarding claim 22, the VPLS information group (IG) ("VC labels", recited in paragraph 0053).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Holmgren by using features as taught by Kermarec et al. in order to provide multi-point connections by using a virtual circuit (See paragraph 0024-0025 for motivation).

Holmgren and Kermarec et al. disclose all the subject matter of the claimed invention with the exception of the following features:

Regarding claim 21, instructions for generating a PNNI Topology State Element (PTSE), instructions for flooding the PNNI hierarchy.

Regarding claim 22, instructions for receiving at least one PNNI Topology State Element (PTSE) from nodes within the child peer group, instructions for flooding each of

the at least one PTSE throughout the peer group, instructions for receiving at least one other PTSE from other logical group nodes within the peer group, each PTSE; instructions for flooding each of the at least one other PTSE throughout the child peer group.

However, Frelechoux '163 form the same field of endeavor discloses the above claimed features:

Regarding claim 21, instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for generating ("generation of PTSEs and flooding", recited in paragraph 0003, lines1-7 and 11-21) a PNNI Topology State Element (PTSE) ("PNNI", recited in paragraph 0003, lines 1-7, and fig. 2, PPNI levels 64 and 72, recited in paragraph 0040, lines 7-17), instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for flooding the PNNI hierarchy("generation of PTSEs and flooding", recited in paragraph 0003, lines1-7 and 11-21).

Regarding claim 22, instructions (fig. 3, Control Logic 2, and PNNI memory 3, recited in paragraph 00048, lines 1-22) for receiving at least one PNNI Topology State Element (PTSE) ("received of PTSE", recited in paragraph 0046) from nodes ("Logical Node 1.1.1 and 1.1.2, recited in paragraph 0046) within the child peer group ("child peer groups", recited in paragraph 0046), instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for flooding ("flooding within peer group", recited in paragraph 0046) each of the at least one PTSE throughout the peer group ("flooding of PTSE to peer group levels 72 and 88", recited in paragraph 0046),

instructions (fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for receiving at least one other PTSE ("receiving of PTSE", recited in paragraph 0046) from other logical group nodes ("Logical Group Nodes 1.1.1 and 1.1.2", recited in paragraph 0046) within the peer group ("Peer Group 88", recited in paragraph 0045, lines 12-19), each PTSE ("PTSE", recited in paragraph 0046); instructions(fig. 3, Control Logic 2 and PNNI memory 3, recited in paragraph 00048, lines 1-22) for flooding ("flooding of PTSE to child peer groups", recited in paragraph 0046) each of the at least one other PTSE throughout the child peer group ("flooding of PTSE to child peer groups", recited in paragraph 0046).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Holmgren with Kermarec by using features as taught by Frelechoux et al. in order to provide managerial function in PAR enabled device (See paragraph 0009-0012 for motivation).

Holmgren '512, Kermarec '268, and Frelechoux '163 disclose all the claimed limitation with the exception of being silent with respect to claimed features:

Regarding claim 21, generating at least one message, each message containing at least two PTSEs.

Regarding claim 22, generating at least one message, each message containing at least two PTSEs.

However, Stone '057 from the same field of endeavor discloses the above claimed features: **Regarding claim 21**, generating at least one message, each message containing at least two PTSEs (noted: generating of topology messages

encoded with port identifiers including path cost and VLAN identifiers and periodic forwarding of topology messages to other switches, col. 5, lines 27-39+).

Regarding claim 22, generating at least one message, each message containing at least two PTSEs (noted: generating of topology messages encoded with port identifiers including path cost and VLAN identifiers and periodic forwarding of topology messages to other switches, col. 5, lines 27-39+).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the features of Holmgren '512 with Kermarec '268, Frelechoux '163 by using features as taught by Stone '057 in order to provide virtual connections whereby topology information/messages are shared as suggested in col. 2, lines 37-48 for motivation.

Holmgren '512, Kermarec '268, Frelechoux '163 and Stone disclose all the claimed limitations as set forth above with the exception of being silent with respect to claimed features:

Regarding claim 21, instructions for selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID, instructions for determining whether the first or the second should initiate the virtual circuit; and instructions for automatically establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

Regarding claim 22, instructions for selecting a first PE and a second PE for a virtual circuit when the first PE determines that the second PE supports the VPLS ID,

instructions for determining whether the first or the second should initiate the virtual circuit; and instructions for automatically establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit.

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

However, Sugiyama '954 from the same field of endeavor discloses the above claimed features:

Regarding claim 21, instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and instructions (noted: routing information that is used for destination

(i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for automatically establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

Regarding claim 21, instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for selecting a first PE (fig. 3, see the ATM edge device 32 coupled to user terminal initiates a VPN connection via destination ATM edge device, col. 3, lines 65 to col. 4, lines 18) and a second PE for a virtual circuit (fig. 2 to fig. 3, see provider ATM edge device 21 communicatively coupled to a second provider ATM edge for providing VPN services over an ATM network 20 based on quality of service parameters, col. 2, lines 18-39) when the first PE determines that the second PE supports the VPLS ID (noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10), instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for determining whether the first or the second should initiate the virtual circuit (noted: switching and connection function for the address of the destination, col. 4, lines 59 to col. 5, lines 1); and instructions (noted: routing information that is used for destination (i.e. VC for VPN connection), col. 5, lines 60 to col. 6, lines 11) for automatically

establishing a respective virtual circuit between the pair of PEs using the respective ATM address of each PE as endpoints of the virtual circuit (noted: connecting based on the virtual channel number and desired QoS, col. 5, lines 24-40, noted: setting up the routing based on VPN ID associated with the virtual ATM circuit and the QoS type, col. 2, lines 52 to col. 3, lines 10, fig. 5, see VPN Ids associated QoS types, virtual circuits that for establishing a VPN connect over an ATM network, col. 6, lines 20-46).

In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching features of Holmgren '512 with Stone '057, Kermarec '268 and Frelechoux '512 by using the teaching features as taught by Sugiyama '954 in order to provide VPN differential services over an ATM network as suggested in col. 2, lines 18-38 for motivation.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kim et al (US 7,266,124 B2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CANDAL ELPENORD whose telephone number is (571)270-3123. The examiner can normally be reached on Monday through Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Bin Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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